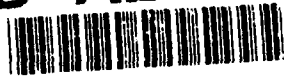AD-A260 908

An Electronic Data Interchange Prototype for

Exchanging Personal Property Shipment Information

MT001R1

W. Michael Bridges

Harold L. Frohman

March 1992

DTIC QUALITY INSPECTED 3

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93-03833

210475

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REPORT DOCUMENTATION PAGE

Form Approved
OPM No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources gathering, and maintaining the data needed, and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Information and Regulatory Affairs, Office of Management and Budget, Washington, DC 20503.

1. AGENCY USE ONLY *(Leave Blank)*	2. REPORT DATE Mar 92	3. REPORT TYPE AND DATES COVERED Final

4. TITLE AND SUBTITLE

An Electronic Data Interchange Prototype for Exchanging Personal Property Shipment Information

5. FUNDING NUMBERS

C MDA903-90-C-0006
PE 0902198D

6. AUTHOR(S)

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7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Logistics Management Institute
6400 Goldsboro Road
Bethesda, MD 20817-5886

8. PERFORMING ORGANIZATION REPORT NUMBER

LMI-MT001R1

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Military Traffic Management Command
Commander
5611 Columbia Pike
Falls Church, VA 22041-5050

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

A: Approved for public release; distribution unlimited

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)*

An EDI prototype system for exchanging personal property shipment information with the Defense Finance and Accounting Service – Indianapolis Center (DFAS-IN) using the American National Standards Institute (ANSI) X12 858 Transaction Set was developed and implemented at Military Traffic Management Command's Personal Property Directorate (MTMC-PP). The purpose of the prototype was to provide MTMC-PP personnel with operational and technical experience before the directorate converts to an EDI production environment.

This report presents the operating concept used in the prototype system for exchanging shipment information between MTMC-PP and DFAS-IN, the findings that emerged from testing the prototype, the recommendations for improving the electronic exchange of personal property information between MTMC-PP and DFAS-IN, and an implementation plan for converting the prototype into a production system.

14. SUBJECT TERMS

Transportation, Electronic Data Interchange, EDI, MTMC, Personal Property, Prototype, 858, GBL

15. NUMBER OF PAGES

30

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	18. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

Executive Summary

AN ELECTRONIC DATA INTERCHANGE PROTOTYPE
FOR EXCHANGING PERSONAL PROPERTY
SHIPMENT INFORMATION

As part of a Department of Defense-wide initiative to automate the exchange of shipment information and the payment of transportation invoices, the Military Traffic Management Command's Personal Property Directorate (MTMC-PP) has a requirement to exchange shipment, payment, and other information with the Defense Finance and Accounting Service – Indianapolis Center (DFAS-IN) and commercial carriers. To test whether personal property shipment information could be transferred effectively using electronic data interchange (EDI) techniques, we developed a prototype system to send that information from MTMC-PP to DFAS-IN using the American National Standards Institute (ANSI) X12 858 Transaction Set.

We found that EDI techniques and the ANSI X12 858 Transaction Set can support the exchange of personal property information between MTMC-PP and DFAS-IN and recommend MTMC-PP expand the prototype to a production system. To aid in that expansion, we provide a detailed implementation plan that requires 6 months to execute and approximately 1,300 hours of MTMC-PP personnel time. The key activities in that plan include modifying the ANSI X12 858 Transaction Set and supporting DoD 858 convention to accommodate DFAS-IN's data requirements, finalizing MTMC-PP's EDI telecommunications configuration, enlarging the Transportation Operational Personal Property Standard System data base, revising internal work procedures to accommodate an electronic environment, and developing a trading partner implementation strategy.

By taking these and other actions, MTMC-PP will create a production EDI system that eliminates the processing of paper associated with personal property Government bills of lading. It also will save an additional $500,000 annually by eliminating a requirement to reimburse DFAS-IN for data entry costs in support of the Freight Information System. The production system will further provide the Military Traffic Management Command with a foundation for future EDI initiatives.

CONTENTS

CHAPTER 1

INTRODUCTION

BACKGROUND

The Defense Finance and Accounting Service — Indianapolis Center (DFAS-IN) is modernizing its transportation payment system to electronically receive shipment and invoice information for purposes of performing prepayment auditing by matching and reconciling rated shipment information with carrier invoices and paying carriers through electronic funds transfer. The first phase of the Transportation Information and Payment System (TIPS) is scheduled to be implemented in June 1992, and the complete system is expected to be operational in 1993.

When complete, TIPS will comply with two Defense Management Report Decisions (DMRDs) that direct the Military Services to reduce transportation costs by implementing prepayment auditing of transportation bills (DMRD 915) and to make maximum use of electronic data interchange (EDI) techniques for the paperless processing of all business-related transactions (DMRD 941). EDI is the computer-to-computer exchange of business information using standard data formats. Private-sector firms have used EDI for years to reduce paperwork and its associated administrative costs, errors, and delays.

The success of TIPS depends upon the ability of other Department of Defense (DoD) systems to send transportation information to DFAS-IN. The Military Traffic Management Command's (MTMC's) Personal Property Directorate (MTMC-PP) plans to use two management information systems, TOPS and WHIST, to send personal property movements to DFAS-IN.[1] TOPS assists installation transportation offices in routing, processing, and managing personal property shipments. Scheduled to be operational in the Continental United States (CONUS) by the end of 1992, TOPS is a distributed application system designed to process and distribute shipment information between personal property shipping offices and WHIST. As

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[1]TOPS = Transportation Operational Personal Property Standard System; WHIST = Worldwide Household Goods Information System for Transportation.

DoD's central personal property transportation data base, WHIST provides shipment information to a variety of DoD activities.

We were tasked by MTMC-PP to develop and implement an EDI prototype system for exchanging personal property shipment information with DFAS-IN, using the American National Standards Institute (ANSI) X12 858 Transaction Set. The purpose of the prototype was to test the feasibility of using that transaction set to transfer personal property shipment information and to provide MTMC-PP personnel with operational and technical experience before the directorate converted to an EDI production environment.

This report presents the operating concept used in the prototype system for exchanging shipment information between MTMC-PP and DFAS-IN, the findings that emerged from testing the prototype, the recommendations for improving the electronic exchange of personal property information between MTMC-PP and DFAS-IN, and an implementation plan for converting the prototype into a production system.

PROTOTYPE SYSTEM OPERATING CONCEPT

The prototype system extracts shipment information from WHIST, formats that information into an ANSI X12 858 Shipment Information Transaction Set, and simulates transmitting that information to TIPS. It also simulates the receipt of that information by TIPS, the reformatting of ANSI X12 shipment information into a format acceptable by TIPS, and the updating of the TIPS application data base. We depict these information flows graphically in Figure 1-1 and describe them in more detail below.

The TOPS captures personal property data at origin and destination shipping offices and transmits the data electronically to WHIST, which then accumulates and stores those data to support DoD's personal property information requirements. For the purpose of the prototype, MTMC-PP prepared TOPS test data and made the data available to WHIST, where the data required to support the TIPS prepayment audit and payment functions were written to a separate EDI data base.

Upon delivery of the shipment to storage or a residence, the move is considered complete. All information associated with the move is then translated into an ANSI X12 858 Shipment Information Transaction Set. We then simulate the transmission
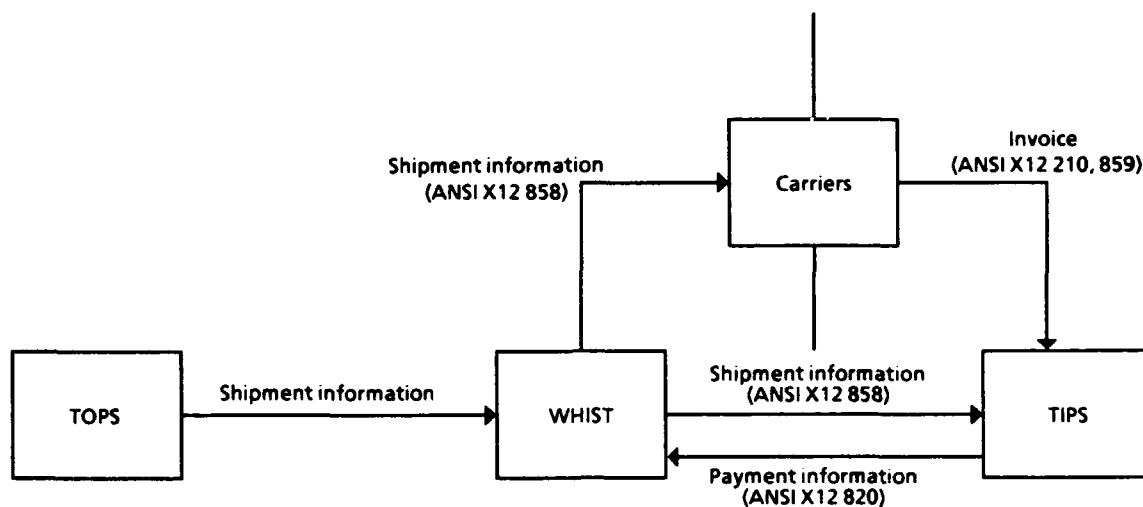
FIG. 1-1. PROTOTYPE OPERATING CONCEPT

of that information to DFAS-IN. (A dedicated leased line already exists between MTMC and DFAS-IN and will be used to transmit EDI data in a production system.)

Although commercial carriers did not participate in the prototype, we show them in Figure 1-1 because they will have a significant role in the production system. Ultimately, carriers will receive ANSI X12 858 shipment information from WHIST for use in generating invoice information that they will transmit to DFAS-IN. (As part of the prepayment audit process, TIPS matches and reconciles invoice information with the corresponding ANSI X12 858 shipment information it receives from WHIST.)

Although electronic payment information following the format of the ANSI X12 820 Transaction Set was not a part of the prototype, it is shown in Figure 1-1 because it eventually will save MTMC $500,000 annually in a production system. (DFAS-IN currently provides MTMC with that payment information at a cost of $500,000.) MTMC uses that payment information for its Freight Information System (FINS).

The prototype system operated in a front-end environment in which we downloaded shipment information from the WHIST computer (a Unisys 5000 series minicomputer) to a microcomputer. EDI translation software, provided by American Business Computer (ABC) and installed on the microcomputer, translated the

downloaded information into the ANSI X. ' 858 Transaction Set before we simulated its transmission to TIPS. The same microcomputer and translation software used to generate the ANSI X12 transaction set at MTMC-PP also simulated its receipt by DFAS-IN. Appendix A provides a more detailed explanation of the prototype.

In the next chapter, we describe the results of testing the prototype, the findings or lessons learned that emerged from the test, and our recommendations for converting the prototype into a production system.

CHAPTER 2

PROTOTYPE TEST FINDINGS AND RECOMMENDATIONS

We began developing the prototype system in May 1991 and tested it from 1 July through 8 August 1991. This chapter provides an overview of the primary findings from testing the prototype and the recommendations we propose to resolve identified problems.

STANDARDS AND CONVENTIONS

The existing ANSI X12 858 Transaction Set can be used to exchange personal property shipment information provided that it is modified slightly. We present our proposed modifications to that standard in Appendix B.

The prototype also showed that the DoD convention is the key for programmers to modify a system's data base to accommodate all data requirements and to develop the application interface software required to exchange data between the application data base and the EDI translation software. (A convention prescribes the location and values of specific information within a transaction set so that trading partners can exchange and interpret the information successfully.) Although considerable effort and resources were required to develop the convention, we still found several issues that needed to be resolved before we could complete the prototype test.[1] In addition, DFAS-IN requested that several new data requirements be added to the convention after we completed the prototype test. Appendix C provides our recommended modifications to the DoD 858 convention.

TECHNICAL ISSUES

During the test, we uncovered a number of technical issues related to TOPS data, data base design, application interface software, and translation software. We discuss these issues below.

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[1]The Logistics Management Institute (LMI), DFAS-IN, General Services Administration, and MTMC-PP jointly developed the data requirements for the prototype. We subsequently published the *DoD 858 Convention, Formatting the U.S. Government Bill of Lading for Privately Owned Personal Property (Standard Form 1203) Using the X12.18 858 Shipment Information Transaction Set*, dated 10 June 1991.

TOPS Data

Because TOPS was not originally designed to capture all of the financial information required by DFAS-IN, some of the data elements required for prepayment audit are not available in an electronic environment. Therefore, we recommend that TOPS be expanded to include all the data needed by DFAS-IN to perform prepayment audits.

Data Base Design

During the prototype development, we found that the WHIST data base does not contain all of the data required by DFAS-IN for prepayment auditing; it also contains a number of items not needed by DFAS-IN. We also found that WHIST records must be stored on line for 5 years, as compared with 90 to 120 days for EDI data.

Because WHIST processes more than 800,000 shipment records each year, we recommend that MTMC-PP create a separate WHIST data base containing only the data required by DFAS-IN. That data base could be created with minimal programming because TOPS data are received and preprocessed by a WHIST data base administration computer before the data are written to the current WHIST data base.

Application Interface Software

The WHIST data base maintains seven categories of personal property movements, each with different data requirements. To generate an ANSI X12 858 Transaction Set, an application interface program extracts that information from the WHIST EDI data base and writes it to a flat file in a format recognized by the EDI translation software.

Rather than creating seven separate application interface programs, we recommend that MTMC-PP develop only one interface program that extracts data for all movement categories. A single interface program would significantly reduce the initial programming effort as well as future maintenance programming.[2] The

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[2]Although some of the data fields are blank, EDI translation software compresses those fields to one character. Nonetheless, those blanks still must be transmitted from the WHIST data base computer across a local area network to the Sun workstation for subsequent translation into an ANSI X12 858 Transaction Set. Even though the blank data fields increase the number of characters transmitted, we believe the resulting decrease in programming effort provides a greater payback.

development of a single application interface program will not be an insignificant effort, based upon MTMC-PP's experience of 10 to 15 man-days for the prototype.

Translation Software

We used ABC's EDI translation software product, EDI-ExCel, to generate the shipment information in a format required by the ANSI X12 858 Transaction Set. (Appendix D describes the process we followed in selecting that software.)

This translation package includes a transaction set mapping utility that allowed MTMC-PP to define its own flat file and then cross-reference the contents of that file to an EDI standard transaction set. That cross-referencing, or transaction set map, translates the user-defined flat file containing shipment information into an ANSI X12 858 Transaction Set. This mapping utility shortened the development time for the prototype. It also reduced the amount of application interface programming needed to extract shipment information from the WHIST data base. (We discuss additional benefits of the mapping utility in Appendix E.)

We found ABC's 2-day training course in operating the software and using the flat file mapping function to be useful and recommend it to all MTMC-PP employees who may use EDI-ExCel's mapping utility.

Overall, we found that ABC's translation software successfully generated ANSI X12 858 Transaction Sets. Consequently, we recommend that MTMC-PP use ABC's EDI-ExCel product in a production environment. During the test, however, we found several EDI-ExCel features that needed to be improved. We recommend that MTMC-PP encourage ABC to make those improvements before it uses EDI-ExCel in a production operation. Appendix F details our recommended improvements.

SUMMARY AND RECOMMENDATIONS

The operating concept tested in this prototype is valid – the ANSI X12 858 Transaction Set can be used to exchange personal property shipment information electronically between MTMC-PP and DFAS-IN. However, that transaction set and its DoD convention need to be modified to fully accommodate personal property shipment information.

Although the technical approach we tested in the prototype is sound, several related issues need to be resolved. TOPS needs to include additional data and MTMC-PP needs to design a data base containing only EDI information. MTMC-PP also needs to request several enhancements to the EDI translation software used by the prototype.

We recommend that MTMC-PP expand the prototype to a production system. The prototype also has the potential to support other EDI applications at MTMC beyond the transmission of shipment information to DFAS-IN, including the exchange of shipment, performance, and rate solicitation information with commercial carriers. The next chapter provides an implementation plan for this expansion.

CHAPTER 3

IMPLEMENTATION PLAN

A variety of actions need to be taken to convert the prototype to a production system. In this chapter, we describe the key implementation tasks in that transition and a schedule for accomplishing them. Figure 3-1 identifies those tasks and presents a proposed implementation timeframe for each.

Task	1991	1992									
	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Finalize ANSI X12 858 Transaction Set[a]											
Modify DoD 858 convention											
Review, finalize, and implement telecommunications configuration											
Install hardware and software											
Review TOPS data base integrity											
Develop Unix scripts											
Update operating procedures											
Develop trading partner implementation strategy											

[a] ANSI approval and publication processes require approximately 9 months.

FIG. 3-1. IMPLEMENTATION PLAN

FINALIZE ANSI X12 858 TRANSACTION SET

In this task, MTMC-PP, in coordination with LMI, submits its proposed modifications to the ANSI X12 858 Transaction Set to the ANSI X12 Transportation Subcommittee for approval. As discussed in the previous chapter, those modifications enable the standard to accommodate personal property shipment information. Following its approval, ANSI publishes the modified ANSI X12 858 standard. We

anticipate that approval and publication will require between 9 and 12 months. Although the ANSI review process is somewhat lengthy, it is vital to enhance the usefulness of the standard. (See Appendix B for details on our proposed modifications.)

We anticipate this task will require 40 hours of MTMC-PP personnel time plus the cost of travel to several Data Interchange Standards Association meetings.

MODIFY THE DoD 858 CONVENTION

Under this task, LMI, working closely with MTMC-PP and DFAS-IN, modifies and publishes an enhanced convention for the personal property implementation of the ANSI X12 858 Transaction Set. Appendix C describes the new data requirements and the additional material that need to be incorporated into the current convention.

We estimate this task will require approximately 12 hours of MTMC-PP personnel time.

REVIEW, FINALIZE, AND IMPLEMENT TELECOMMUNICATIONS CONFIGURATION

In this task, MTMC-PP reviews, finalizes, and implements its telecommunications configuration for transferring shipment information between the WHIST data base computer (Unisys) and the computer upon which the EDI translation software resides (Sun workstation). We expect that a local area network will be used for this connection as well as to transfer EDI data from the Sun workstation to a dedicated telecommunications computer. The latter will transmit the EDI data to the TIPS computer using MTMC's dedicated 56 kilobytes line and to an EDI value-added network (VAN) accessible by MTMC-PP's commercial carrier trading partners. (The EDI Executive Agent is now procuring the EDI VAN.)

We estimate this task will require 80 hours of MTMC-PP personnel time to coordinate the linkages with DFAS-IN and to integrate EDI into the local area network.

INSTALL HARDWARE AND SOFTWARE

Under this task, ABC installs the Unix version of its translation software product, EDI-ExCel, on MTMC-PP's EDI hardware platform, a Sun workstation. ABC also converts the transaction set maps created by LMI and MTMC-PP on an

MS-DOS based microcomputer to operate on the Sun workstation. In addition, MTMC-PP integrates the Sun workstation into its EDI hardware and telecommunications configuration.

We estimate that MTMC-PP will expend 60 hours of personnel time to complete this task.

REVIEW TOPS DATA BASE INTEGRITY

In this task, MTMC-PP determines the most efficient way to satisfy the data requirements of the ANSI X12 858 standard from the TOPS data base. In addition, MTMC-PP, in close coordination with DFAS-IN, reviews its editing practices of the TOPS data that it transmits to DFAS-IN for use in the prepayment audit process.

This task will require apprximately 40 hours of personnel time.

DEVELOP UNIX SCRIPTS

In this task, MTMC identifies and develops the Unix programming scripts that automatically extract EDI data from the WHIST data base, write the necessary flat file, transfer that file to the Sun workstation, run EDI-ExCel to translate the data into an ANSI X12 858 Transaction Set, and transfer these data to the telecommunications computer for transmission to DFAS-IN and commercial carriers.

We estimate that MTMC-PP will need to invest 80 hours of personnel time to develop the Unix scripts.

UPDATE OPERATING PROCEDURES

In this task, MTMC-PP revises its work methods to accommodate an electronic operating environment. As part of those methods, MTMC-PP needs to develop detailed operating procedures for day-to-day EDI operations including translation software operation, transmission scheduling, customer service, audit trails, archiving, and backup procedures. It also needs to develop procedures for maintaining trading partner relationships, parallel paper controls, and data security.

We estimate this task will require 320 hours of MTMC-PP personnel time.

DEVELOP TRADING PARTNER IMPLEMENTATION STRATEGY

In this task, MTMC-PP formulates a strategy for establishing and promoting the use of EDI with its major trading partners. That strategy includes development of memorandums of understanding with its internal DoD trading partner, such as DFAS-IN, that address the pace of implementation, testing and production procedures, and interface requirements.

To establish EDI relationships with its external trading partners, such as personal property carriers, MTMC-PP needs to change DoD regulations that specify the contractual requirements of each carrier. Those regulations should be expanded to include the information needed to identify the sender and receiver of EDI information, points of contact, and frequency with which each trading partner accesses its EDI VAN mailbox.

As awareness of MTMC-PP's EDI program increases, more carriers will want to participate. Because many of those carriers will have limited experience with EDI, MTMC-PP needs to develop an EDI information package for prospective external trading partners. That package should describe DoD's transaction set conventions and regulation changes and provide an introduction to using EDI to do business with MTMC-PP.

Finally, MTMC also needs to encourage the entry of personal property carriers into its EDI program by hosting carrier workshops and attending major personal property association conferences.

We expect this task will require approximately 640 hours of MTMC-PP personnel time over a 6-month period.

SUMMARY

To ensure a successful transition from the EDI prototype to a production system, MTMC needs to take a variety of actions. Some of those actions, such as modification of the ANSI X12 858 standard and DoD convention and development of the trading partner implementation strategy, are already in progress. Overall, we estimate the transition to a production system will take 6 months, consume approximately 1,300 hours of personnel time, and result in significant savings.

APPENDIX A

PROTOTYPE SYSTEM

This appendix describes the concept of operations underlying the electronic data interchange (EDI) prototype for exchanging personal property shipment information.

We configured the prototype to accommodate the procedures that the Military Traffic Management Command's (MTMC's) Personal Property Directorate (MTMC-PP) and Defense Finance and Accounting Service – Indianapolis Center (DFAS-IN) routinely follow in processing personal property shipment information. Because the interface between the Transportation Operational Personal Property Standard System (TOPS) and Worldwide Household Goods Information System for Transportation (WHIST) will not be operational until April 1992 and DFAS-IN will not be prepared to receive personal property information electronically until June 1992, MTMC-PP developed and input test data directly into a new EDI data base within WHIST. MTMC-PP also simulated the receipt of shipment information by DFAS-IN. Furthermore, because the Sun workstation that will serve as the operational hardware platform was not available, we used a Unisys 386 microcomputer, employing an MS-DOS version of American Business Computer's EDI-ExCel translation software.

In cooperation with DFAS-IN. MTMC-PP, and the General Services Administration, we identified the data requirements for personal property shipment information. We then published the *DoD (Department of Defense) 858 Convention, Formatting the U.S. Government Bill of Lading for Privately Owned Personal Property (Standard Form 1203) Using the X12.18 858 Shipment Information Transaction Set*, dated 10 June 1991. That document defines the rules for trading partners to follow in using a specific transaction set to exchange business information.

Following the identification of the data requirements and completion of the DoD 858 convention, MTMC-PP designed and developed an EDI data base containing only the WHIST data required for the prototype. It also developed application programs to create that data base using data received from TOPS and subsequently

processed by the WHIST data base administration computer. MTMC-PP further developed several application interface programs, using Sequential Query Language (SQL), to extract test data from the WHIST EDI data base and generate a flat file for use by the EDI-ExCel translation software. We then used EDI-ExCel's transaction set mapping utility to define a flat file containing the outbound personal property data needed to create an American National Standards Institute (ANSI) X12 858 Transaction Set, which EDI-ExCel also generated.

The EDI-ExCel translation software contains a trading partner utility that maintains information specific to each trading partner. That information includes the version of the X12 standard required by the trading partner; the transaction set map defined for use with that trading partner; the name of the output file containing the shipment information in X12 858 format; and the unique identification name for each trading partner, which is placed at the beginning of each record in the flat file. To draw upon the capability of that utility, we created a DFAS-IN trading partner record for use by MTMC-PP when it simulated the sending of EDI data to DFAS-IN. MTMC-PP also used that record to simulate the receiving of ANSI X12 transaction sets from DFAS-IN.

Next, we developed a transaction set map for an inbound ANSI X12 858 Transaction Set using EDI-ExCel's mapping utility to simulate DFAS-IN's receipt of that transaction set. MTMC-PP then simulated DFAS-IN's processing of that information by translating it into a flat file defined by the inbound transaction set map. For demonstration purposes, MTMC-PP developed another application interface program (using SQL) to read the flat file and write the data to the corresponding fields in the WHIST EDI data base. If DFAS-IN had been fully EDI capable, it would have developed an interface program to read the flat file and subsequently write it to the Transportation Information and Payment System data base.

APPENDIX B

ANSI X12 858 TRANSACTION SET MODIFICATIONS

This appendix lists the modifications needed for the American National Standards Institute (ANSI) X12 858 Transaction Set to fully accommodate personal property shipment information.

The maximum use of the N1 weight loop, position 390 in the segment hierarchy, needs to be increased to 20. The transaction set also needs a number of new codes, all of which must be approved by the ANSI X12 Government Subcommittee. We show those codes and corresponding information in Table B-1.

TABLE B-1

NEW ANSI X12 CODES

PPGBL data name	Table	Pos	Ref Des	DE#	Value	DoD convention
Bill purpose/application type	A	30	BX07	147	P	Personal property
Number of dependents less than 12 years qualifier	A	430	REF01	128	D9	Dependent info.
Authority for shipment order number qualifier	A	430	REF01	128	OR	Order number
Authority for shipment paragraph number qualifier	A	430	REF01	120	N1	Paragraph number
Consolidate shipment number qualifier	A	60	N901	128	C2	Consolidation number
Rate area qualifier	A	420	N40G	309	RA	Rate area code
Appropriation number qualifier	A	280	NTE01	363	APS	Appropriation specification
Consumables net weight unit qualifier	B	140	L009	187	CN	Consumables net weight
Date qualifier	B	100	N901	128	A5	Accessorial status code
SIT date converted to member's expense	B	100	N901	128	25	Storage
SIT weight in qualifier	B	140	L005	187	SI	SIT weight in
SIT weight out qualifier	B	140	L005	187	S	SIT weight out
Authorized ship from qualifier	A	390	N101	98	AF	Authorized from
Authorized ship to qualifier	A	390	N101	98	AT	Authorized to
SIT origin location name qualifier	A	390	N101	98	WO	Warehouse at origin
SIT destination location qualifier	A	390	N101	98	WD	Warehouse at destination
Termination location name qualifier	A	390	N101	98	TL	Termination location
Diversion from location name qualifier	A	390	N101	98	TP	Transfer point
Diversion to location name qualifier	A	390	N101	98	TT	Transfer to

Note: PPGBL = personal property Government bill of lading, Pos = position, DE# = data element number, Ref Des = reference designator, SIT = storage-in-transit

B-1

APPENDIX C

DoD 858 CONVENTION MODIFICATIONS

This appendix presents our recommended modifications to the *DoD (Department of Defense) 858 Convention, Formatting the U.S. Government Bill of Lading for Privately Owned Personal Property (Standard Form 1203) Using the X12.18 858 Shipment Information Transaction Set*, dated 10 June 1991. The following data requirements are new and should be added:

- Bill charges to DoDAAC (Department of Defense Activity Address Code)

- Excess cost indicator

- Non-temp storage at origin indicator.

The convention also needs a new appendix that offers more detailed specifications than are currently provided in the body. The new appendix should include the following items:

- A cross-reference of Military Traffic Management Command's Personal Property Directorate accessorial codes to the corresponding American National Standards Institute X12 code

- The appropriate billable unit qualifier required for each accessorial service

- The accounting classification funding structure that is specified by the Defense Finance and Accounting Service — Indianapolis Center for citing the appropriate fund.

APPENDIX D

SELECTION PROCESS FOR EDI TRANSLATION SOFTWARE

This appendix describes our process for selecting an electronic data interchange (EDI) translation software package to support the Military Traffic Management Command's Personal Property Directorate (MTMC-PP) prototype.

Part of our tasking from MTMC-PP was to procure EDI translation software for use in the prototype. After evaluating the potential software packages, we executed a sole-source procurement with American Business Computer (ABC) because its EDI-ExCel product was the only one that met MTMC-PP's requirements. Those requirements were straightforward:

- The software had to operate on multiple Unix-based hardware platforms including a Sun workstation, Model #4/75 GXN-16; Unisys 5000 Model #95; and AT&T 3B2 Model 600G.

- The supplier had to be financially stable, with a customer base that already was using the software.

Using our report PL005R1, *A Guide to EDI Translation Software, 1991 Edition*, we identified only two vendors, ABC and St. Paul Software, that met those requirements. A third vendor, EDI, Inc., had some Unix experience, but its translation software product ran only on a Unisys 5000 and Tandem minicomputer.

Both the Defense Logistics Agency (DLA) and Defense Finance and Accounting Service — Indianapolis Center's (DFAS-IN's) subcontractor, IBM, had already independently evaluated the software packages from ABC and St. Paul Software. Following several months of testing, DLA judged ABC's product to be superior in the areas of user friendliness of the EDI mapping utility and total product performance. It found St. Paul Software's mapping utility to be cumbersome, even requiring a DLA technician to learn a proprietary language.

These software packages were rated equal in all technical areas, excluding the mapping utility, by IBM. (IBM believed the mapping utility had little value.) Based on price, IBM recommended that DFAS-IN purchase St. Paul Software's product without the mapping utility. However, we thought that the mapping utility was key

to the success of MTMC-PP's prototype because it allowed us to define the transaction set maps while MTMC-PP concentrated on extracting data from the Worldwide Household Goods Information System for Transportation data base in the format required by the map. By eliminating the need for MTMC-PP personnel to learn a new software product and how to define a map, we reduced prototype development time by 3 to 4 weeks, which essentially offset the approximately $4,000 price differential.

APPENDIX E

BENEFITS OF TRANSLATION SOFTWARE MAPPING FUNCTION

In this appendix, we examine the benefits of using the transaction set mapping utility included in American Business Computer's electronic data interchange (EDI) translation software product, EDI-ExCel.

The mapping utility substantially shortened the development time for the prototype by permitting the interface programming to be undertaken separately from the transaction set mapping. As a result, Military Traffic Management Command's Personal Property Directorate personnel did not have to learn how to use the mapper or fully understand EDI, but simply concentrate on developing the interface program, while we used the DoD (Department of Defense) 858 convention document to define the transaction set maps.

The mapping utility has several additional benefits. It reduces the amount of interface programming by allowing *certain data element codes to be automatically generated by the translator* rather than maintaining the codes in the Worldwide Household Goods Information System for Transportation EDI data base or requiring the interface program to generate them. This ability to generate codes from the transaction set map should result in reduced maintenance programming because only the map would need to be modified should any codes be added or changed. Future maintenance programming will also be reduced if and when the American National Standards Institute (ANSI) modifies the transaction set standard because the mapping utility will automatically accommodate many of those changes.

The mapping utility also performs some general application data editing, which eliminates the need for interface programming. By using segment loop qualifiers and data element qualifiers, the utility will not write data to the flat file unless certain conditions are met. For example, the accessorial services loop in the personal property convention of the ANSI X12 858 Transaction Set is designated by an LX segment with a value of 300. Consequently, the inbound transaction set map does not accept data in the LX loop and subsequently transfer it to the corresponding accessorial positions in the flat file, if the LX value is a value other than 300.

The easiest and most efficient method of maintaining the transaction set maps is to use short mapping records that contain fewer than five data elements. Short records simplify modifications to the application interface programs and to the map itself; they also make it easier to read the flat file when debugging the interface program. One successful technique for creating short records was to group similar data together in one record in the map. For example, although name, additional name, address, and geographic location data require different segments in the ANSI X12 858 Transaction Set, we grouped them together into one record that simplified the map maintenance.

APPENDIX F

PROPOSED ENHANCEMENTS TO EDI-EXCEL SOFTWARE

This appendix describes the enhancements that we believe need to be made to American Business Computer's (ABC's) electronic data interchange (EDI) translation software product, EDI-ExCel, in order to fully meet the Military Traffic Management Command Personal Property Directorate's requirements.

We believe that ABC needs to give EDI-ExCel the capability to verify that EDI data sent to the trading partners are in compliance with American National Standards Institute X12 standards. This process is typically referred to as outbound compliance checking. Currently, EDI-ExCel's transaction sets can be sent to a trading partner even if EDI syntax errors exist.

In addition, ABC needs to add a functional acknowledgment reconciliation report capability to EDI-ExCel. That capability will enable the Personal Property Directorate to match transaction set messages with functional acknowledgments to confirm the successful receipt of information by trading partners or to identify unsuccessful transmissions.